IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT, Plaintiff, v. ZTE CORPORATION, ZTE (USA) INC., AND ZTE (TX), INC. Defendants.	§ § § § § § § § § § § §	CIVIL ACTION NO. 6:20-cv-495 **JURY TRIAL DEMANDED**

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Brazos" or "Plaintiff"), by and through its attorneys, files this Complaint for Patent Infringement against Defendants ZTE Corporation, ZTE (USA), Inc. and ZTE (TX), Inc. (collectively "ZTE" or "Defendants") and alleges:

NATURE OF THE ACTION

1. This is a civil action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. §§ 1, et seq., including §§ 271, 281, 284, and 285.

THE PARTIES

2. Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 605 Austin Ave, Ste 6, Waco, TX 76701.

3. On information and belief, Defendant Zhongxing Telecommunications Equipment (abbreviated as "ZTE") Corporation is a Chinese corporation that does business in Texas, directly or through intermediaries, with a principal place of business at ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen China.

4. On information and belief, Defendant ZTE (USA) Inc. is a New Jersey corporation that does business in Texas, directly or through intermediaries, with a principal place of business in business in Richardson, Texas.

5. On information and belief, Defendant ZTE (TX) Inc. is a Texas corporation that does business in Texas, directly or through intermediaries, with a principal place of business in business in Austin, Texas.

6. All of the Defendants operate under and identify with the trade name "ZTE." Each of the Defendants may be referred to individually as a "ZTE Defendant" and, collectively, Defendants may be referred to below as "ZTE" or as the "ZTE Defendants."

JURISDICTION AND VENUE

7. This is an action for patent infringement which arises under the Patent Laws of the United States, in particular, 35 U.S.C. §§271, 281, 284, and 285.

8. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

9. This Court has specific and general personal jurisdiction over each ZTE Defendant pursuant to due process and/or the Texas Long Arm Statute, because each ZTE Defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over each ZTE Defendant would not offend traditional notions of fair play and substantial justice because ZTE has established minimum contacts with the forum. For example, on information and belief, ZTE Defendants have committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

10. Venue in the Western District of Texas is proper pursuant to 28 U.S.C. §§1391 and/or 1400(b). The ZTE Defendants have committed acts of infringement and have places of businesses in this District and/or are foreign entities for purpose of §1391. As non-limiting examples, ZTE (TX) has maintained a place of business at 7000 N MO-PAC EXPRESSWAY 200 AUSTIN, TX 7873; and, ZTE (USA) has maintained a place of business at 6500 River Place Blvd., Austin, TX 78730. ZTE Corporation also describes a "research-and-development center in Austin, Texas."[1]

COUNT ONE - INFRINGEMENT OF U.S. PATENT NO. 9,258,232

11. Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

12. On February 9, 2016, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,258,232 ("the '232 Patent"), entitled "INGRESS TRAFFIC FLOW CONTROL IN A DATA COMMUNICATIONS SYSTEM." A true and correct copy of the '232 Patent is attached as Exhibit A to this Complaint.

13. Brazos is the owner of all rights, title, and interest in and to the '232 Patent, including the right to assert all causes of action arising under the '232 Patent and the right to any remedies for the infringement of the '232 Patent.

14. ZTE makes, uses, sells, offers for sale, imports, and/or distributes, in the United States, networking products including routing switches supporting the Quantized Congestion Notification (QCN) protocol (collectively, the "Accused Products").

[1] https://res-www.zte.com.cn/mediares/magazine/publication/tech_en/pdf/201009.pdf

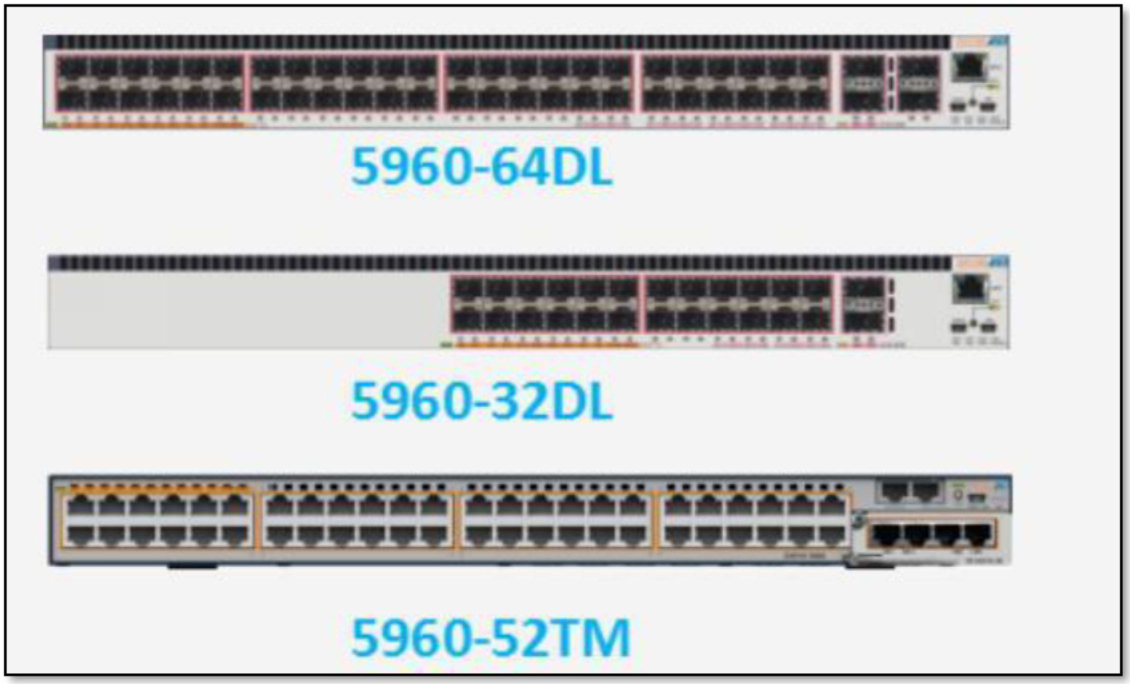
15. The Accused Products include the ZXR10 5900 series routing switches, including the ZXR10 5960-32DL, 5960-64DL, and 5960-52TM, and the ZXR10 5960-H series routing switches, including the ZXR10 5960-4M-HC, 5960-32LC-H, 5960-64DL-H, 5960-72DL-H, 5960-72NL-H, and 5960-56QU-HC routing switches.

ZXR10 5960 Series Switch

…

The ZXR10 5960 Series switch is next-generation switch with high switching capacity and high port density for data center TOR and carrier access and aggregation scenario. It provides high density 10GE/40GE interfaces, carrier-class reliability and superior scalability. The ZXR10 5960 Series switch supports extensive data center service features such as VSC (Virtual Switch Cluster)/ TRILL (Transparent Interconnection of Lots of Links)/ Front-to-back Airflow and Ethernet ring protection for L2 Ethernet service. The ZXR10 5960 Series switch can work with the ZXR10 9900 Series switch to build an elastic, virtualized, high-quality switching network that meets the requirements of cloud-computing data centers.

…



https://www.zte.com.cn/global/products/bearer/data_communication/ethernet_switch/5960-EN;

https://www.zte.com.cn/global/products/bearer/data_communication/ethernet_switch/5960-H-EN.

> Support DCB (Data Center Bridging) protocol family and fully guarantee network reliability and no loss in full range. The ZXR10 5960 Series switch supports PFC (Priority-based Flow Control), QCN (Quantized Congestion Notification), ETS (Enhanced Transmission Selection), DCBX (Data Center Bridging Exchange), which ensure low latency and zero packet loss for high-speed computing services.

https://www.asit.it/wp-content/uploads/2018/04/zte_ZXR10_5960_serie.pdf (Page 4).

> • Support DCB (Data Center Bridging) protocol family and fully guarantee network reliability and no loss in full range. The ZXR10 5960 Series switch supports PFC (Priority-based Flow Control), QCN (Quantized Congestion Notification), ETS (Enhanced Transmission Selection), DCBX (Data Center Bridging Exchange), which ensure low latency and zero packet loss for high-speed computing services.

https://www.zte.com.cn/global/products/bearer/data_communication/ethernet_switch/5960-EN.

16. ZXR10 5960 series and ZXR10 5960-H series switches implement the IEEE 802.1Q (Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks) standard (also referred to as IEEE 802.1q) for detection and control of a congestion condition in the network. IEEE 802.1Q includes the Quantized Congestion Notification protocol.

Function	The ZXR10 5960 Series Switch
L2 Features	Support IEEE 802.1p (COS), IEEE 802.1q (VLAN), IEEE 802.3x Support IEEE 802.1d (STP)/ 802.1w (RSTP)/ 802.1s (MSTP) Support IEEE 802.3ad (LACP) Support IEEE 802.3z (1000Base-X) / 802.3ab (1000BaseT) Support IEEE 802.3an (10GBase-T), IEEE 802.3ae (10Gbase) Support IEEE 802.3ba (40Gbase), IEEE 802.3ba (100Gbase) Support Port mirroring, Traffic mirroring Support VLAN switching, VLAN translation Support PVLAN, SuperVLAN Support GVRP Support LLDP

https://www.asit.it/wp-content/uploads/2018/04/zte_ZXR10_5960_serie.pdf, (Page 8).

Function	The ZXR10 5960-H Series Switch

…

L2 Features	Support IEEE 802.1p (COS), IEEE 802.1q (VLAN), IEEE 802.3x Support IEEE 802.1d (STP)/ 802.1w (RSTP)/ 802.1s (MSTP) Support IEEE 802.3ad (LACP)

https://sdnfv.zte.com.cn/upload_files/440ed336-3d3f-11e9-abd7-744aa4020e29.pdf (Page 11).

IEEE Std 802.1Q™-2011
(Revision of
IEEE Std 802.1Q-2005)

…

30.2 Quantized Congestion Notification protocol

This subclause provides an overview of the baseline simulation of the QCN algorithm (Alizadeh, et al.) [B1] used to develop this standard. This introduction provides no normative text. It will focus on the key features of the QCN algorithm, omitting the normative details given in the rest of this standard.

https://ieeexplore.ieee.org/document/6009146 (Page 1100).

17. The Accused Products supports the Quantized Congestion Notification (QCN) protocol for traffic flow control. The QCN protocol include a QCN Algorithm that has (1) a Congestion Point Algorithm and (2) a Reaction Point Algorithm. The Congestion Point Algorithm can generate a feedback message (Congestion Notification Message(CNM)) to indicate a period of congestion. The feedback message contains information about the extent of congestion at the congestion point. The Reaction Point Algorithm in the Accused Products changes its Flow Rate to control the flow of data packets using the feedback message received

from the Congestion Point.

> The QCN algorithm is composed of the following two parts:
>
> a) **Congestion Point (CP) Algorithm:** this is the mechanism by which a congested bridge or end station buffer samples outgoing frames and generates a feedback message (Congestion Notification Message or CNM, 33.3, in this standard) addressed to the source of the sampled frame. The feedback message contains information about the extent of congestion at the CP.
>
> b) **Reaction Point (RP) Algorithm:** this is the mechanism by which a Rate Limiter (RL) associated with a source decreases its sending rate based on feedback received from the CP, and increases its rate *unilaterally* (without further feedback) to recover lost bandwidth and probe for extra available bandwidth.

https://ieeexplore.ieee.org/document/6009146 (Page 1101).

18. The Congestion Point Algorithm maintains the check on the incoming and outgoing packets with the help of buffer queue size calculation. The Congestion point feedback message contains a Congestion measure (Fb), which determines the amount of buffer queue filled or not. For example, if the Fb is less than 0, the congestion message is sent to the source,

and if the Fb is greater than or equal to 0, the congestion message is not sent.

30.2.1 The CP Algorithm

A bridge containing a CP is modeled as an ideal output-queued bridge. The CP buffer is shown in Figure 30-1. The goal of the CP is to maintain the buffer occupancy at a desired operating point, Q_{eq}.[40] The CP computes a congestion measure F_b (defined below) and, with a probability depending on the severity of congestion, selects a frame from the incoming stream and sends the value of F_b in a feedback message to the source of the selected frame.

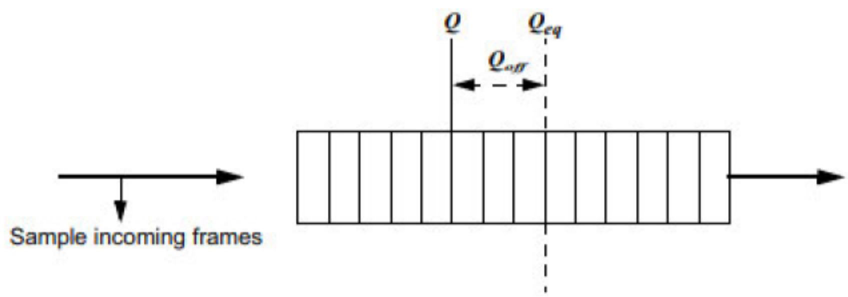


Figure 30-1—Congestion detection in QCN CP

Let Q denote the instantaneous queue size and Q_{old} denote the queue size when the last feedback message was generated. Let $Q_{off} = Q - Q_{eq}$ and $Q_\delta = Q - Q_{old}$.

Then F_b is given by Equation (1).

$$F_b = -(Q_{off} + wQ_\delta) \qquad (1)$$

where w is a non-negative constant, taken to be 2 for the baseline simulation. The value of F_b is quantized to 6 bits before transmission, based on Q_{eq} and w.

The interpretation is that F_b captures a combination of queue size excess (Q_{off}) and rate excess (Q_δ). Indeed, $Q_\delta = Q - Q_{old}$ is the *derivative* of the queue size and equals input rate less output rate. Thus, when F_b is negative, the buffer is oversubscribed. When $F_b < 0$, Figure 30-2 shows the probability with which a congestion message is reflected back to the source as a function of $|F_b|$. The feedback message contains the value of F_b, quantized to 6 bits. When $F_b \geq 0$, there is no congestion and no feedback messages are sent.

https://ieeexplore.ieee.org/document/6009146 (Page 1101).

19. The Congestion Point Algorithm configures various congestion point variables. One such variable is cpW (Congestion Point Weight), a real number which is equivalent to the weight factor that applies to the change in queue length. cpW is used in the calculation of Congestion Point Quantized Feedback (cpFb).

```
ieee8021CnCpFeedbackWeight OBJECT-TYPE
    SYNTAX       Integer32 (-10..10)
    MAX-ACCESS   read-write
    STATUS       current
    DESCRIPTION
       "This object controls the weight (cpW) change in queue length
        in the calculation of cpFb when the Congestion Point is
        generating a Congestion Notification Message.

        The weight cpW is equal to two to the power of this object.
        Thus, if this object contains a -1, cpW = 1/2.
```

https://ieeexplore.ieee.org/document/6009146 (Page 856).

32.8.6 cpW

Real number. cpW is the weight to be given to the change in queue length in the calculation of cpFb (32.8.9). Default value 2. Although cpW is specified as a real number, it is constrained to be a power of 2, e.g., 1/2, 1, 2, 4. In practice, therefore, it can be represented as a shift distance (plus an addition) in 32.9.4:e.

https://ieeexplore.ieee.org/document/6009146 (Page 1127).

20. The Congestion Point Quantized Feedback (cpFb) is calculated with the use of cpW. With an increase in cpW, cpFb decreases, and vice versa.

32.8.9 cpFb

Signed integer. Calculated just before the CP attempts to enqueue a frame:

$$\text{cpFb} = \text{cpQOffset} - \text{cpW} \times \text{cpQDelta},$$

where

$\text{cpQDelta} = \text{cpQLen} - \text{cpQLenOld}$ $\text{cpQOffset} = \text{cpQSp} - \text{cpQLen}$

cpFb has two terms. The first term is the difference between the current and the desired queue lengths (cpQOffset, 32.8.7). The second is a weight factor cpW times the difference cpQDelta (32.8.8) between the current and the previous queue lengths. Thus, a multiple of the first derivative of the queue size is subtracted from the current nonoptimality of the queue, so that if the queue length is moving toward the set point cpQSp, cpFb will be closer to 0 than if the queue length is moving away from cpQSp.

https://ieeexplore.ieee.org/document/6009146 (Page 1101).

21. The Congestion Notification Message - Protocol Data Unit (CNM PDU) contains a Quantized Feedback Field. The Quantized Feedback field calculations include the values of

the congestion point weight parameter (cpW) and the Congestion Point Quantized Feedback (cpFb) parameter.

> Fills the Quantized Feedback field (33.4.3) of the CNM PDU as follows:
> if $(cpFb < -cpQSp \times (2 \times cpW + 1))$
>   Quantized Feedback = 63
> else
>   Quantized Feedback = $-cpFb \times 63 / (cpQSp \times (2 \times cpW + 1))$

https://ieeexplore.ieee.org/document/6009146 (Page 1130).

22. Similar to the Congestion Point variables, the QCN Protocol in the Accused Products also has Reaction Point variables such as rpFb (Reaction Point Quantized Feedback). rpFb is the value last received in the Quantized Feedback Field of a CNM PDU or 0.

> **32.13.9 rpFb**
>
> Unsigned integer. The value last received in the Quantized Feedback field (33.4.3) of a CNM PDU or 0.

https://ieeexplore.ieee.org/document/6009146 (Page 1134).

23. The ReceiveCnm function in the Accused Products performs various actions. One of the actions is that it sets the rpFb variable from the CNM's Quantized Feedback Field.

> **32.14.4 ReceiveCnm**
>
> Called whenever a CNM is received. ReceiveCnm() performs the following actions:
>
> a) The CNM is validated according to 33.4.11 and is discarded if invalid.
> b) If the CNM frame carries a CN-TAG (33.2), the Flow Identifier from that CN-TAG (33.2.1) is used to identify the particular RP rate control state machine to which this CNM applies.
> c) If the receiving end station is unable to identify the particular RP rate control state machine to which this CNM applies, it discards the CNM, and no further processing takes place.
> d) Sets the rpFb variable from the CNM's Quantized Feedback field (33.4.3).

https://ieeexplore.ieee.org/document/6009146 (Page 1135).

24. As the Quantized Feedback field calculations include the values of the Congestion Point weight parameter (cpW) and the Congestion Point Quantized Feedback (cpFb)

parameter, the Reaction Point variable rpFb incorporates the Congestion Point Weight (cpW) as per the feedback (CNM) received from the Congestion Point. rpFb is further used in adjusting the flow by Rate Limiter.

> The QCN algorithm is composed of the following two parts:
>
> a) **Congestion Point (CP) Algorithm:** this is the mechanism by which a congested bridge or end station buffer samples outgoing frames and generates a feedback message (Congestion Notification Message or CNM, 33.3, in this standard) addressed to the source of the sampled frame. The feedback message contains information about the extent of congestion at the CP.
>
> b) **Reaction Point (RP) Algorithm:** this is the mechanism by which a Rate Limiter (RL) associated with a source decreases its sending rate based on feedback received from the CP, and increases its rate *unilaterally* (without further feedback) to recover lost bandwidth and probe for extra available bandwidth.

https://ieeexplore.ieee.org/document/6009146 (Page 1101).

25. The ProcessCnm function in the Accused Products performs actions that are dependent on reaction point variables such as dec_factor. The dec_factor is further dependent on the rpFb parameter. Also, the reaction point Current Rate (rpCurrentRate) is a function of dec_factor (decrement).

32.14.5 ProcessCnm

Called whenever the RP rate control state machine enters the RPR_CNM_RECEIVED state (Figure 32-2) to perform the following actions:

```
if (rpByteStage ! = 0) {
        rpTargetRate = rpCurrentRate;
        rpByteCount = rpgByteReset;
}
rpByteStage = 0;
rpTimeStage = 0;
dec_factor = (1 – (rpgGd * rpFb));
if (dec_factor < rpgMinDecFac)
        dec_factor = rpgMinDecFac;
rpCurrentRate = rpCurrentRate * dec_factor;
if (rpCurrentRate < rpgMinRate)
        rpCurrentRate = rpgMinRate;
RpWhile = rpgTimeReset;
```

https://ieeexplore.ieee.org/document/6009146 (Page 1136).

26. A function in the Reaction Point algorithm, AdjustsRates function, is used to adjust the rate limit of packet flow with the help of rpCurrentRate and rpTargetRate wherein rpCurrentRate is dependent on rpFb. These rate parameters are associated with the Rate Limiter (RL). The Current Rate is the transmission rate of the Rate Limiter (RL) at any time, and the Target Rate is the sending rate of the RL just before the arrival of the last feedback message and the new goal for the current rate.

Current Rate (*CR*): The transmission rate of the Rate Limiter (RL) at any time.
Target Rate (*TR*): The sending rate of the RL *just before* the arrival of the last feedback message, and the new goal for the Current Rate.

https://ieeexplore.ieee.org/document/6009146 (Page 1102).

27. An AdjustsRates function in the Accused Products is used to adjust the rate of the packet flow with the help of rpCurrentRate and rpTarget Rate, which are rate parameters associated with the Rate Limiter. The rpCurrentRate is dependent on the rpFb variable, which is calculated with the help of cpW (Congestion Point Weight), as explained above. Hence, AdjustRates is a function of cpW (Congestion Point Weight).

32.14.6 AdjustRates

AdjustRates is called whenever the RPR_ADJUST_RATES, RPR_ACTIVE_INCREASE, or RPR_HYPER_INCREASE states are entered. It takes one parameter, *increase*, that specifies how much to increase rpTargetRate, and performs the following actions:

```
if ((rpByteStage == 1) || (rpTimeStage == 1))   &&   (rpTargetRate > 10 * rpCurrentRate))
        rpTargetRate = rpTargetRate / 8;
else
        rpTargetRate = rpTargetRate + increase;
rpCurrentRate = (rpTargetRate + rpCurrentRate)/2;
if (rpCurrentRate > rpgMaxRate)
        rpCurrentRate = rpgMaxRate;
```

https://ieeexplore.ieee.org/document/6009146 (Page 1136).

b) **Reaction Point (RP) Algorithm:** this is the mechanism by which a Rate Limiter (RL) associated with a source decreases its sending rate based on feedback received from the CP, and increases its rate *unilaterally* (without further feedback) to recover lost bandwidth and probe for extra available bandwidth.

https://ieeexplore.ieee.org/document/6009146 (Page 1101).

28. In view of preceding paragraphs, each and every element of at least claim 1 of the '232 Patent is found in the Accused Products.

29. ZTE has and continues to directly infringe at least one claim of the '232 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing, and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

30. ZTE has received notice and actual or constructive knowledge of the '232 Patent since at least the date of service of this Complaint.

31. Since at least the date of service of this Complaint, through its actions, ZTE has actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the '232 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://www.zte.com.cn/global/products/bearer/data_communication/ethernet_switch/5960-EN
- https://www.zte.com.cn/global/products/bearer/data_communication/ethernet_switch/5960-H-EN
- https://www.asit.it/wp-content/uploads/2018/04/zte_ZXR10_5960_serie.pdf
- https://sdnfv.zte.com.cn/upload_files/440ed336-3d3f-11e9-abd7-744aa4020e29.pdf

32. Since at least the date of service of this Complaint, through its actions, ZTE has contributed to the infringement of the ’232 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the ’232 Patent. The Accused Products are especially made or adapted for infringing the ’232 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the ’232 Patent.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

(A) Enter judgment that ZTE infringes one or more claims of the ’232 Patent literally and/or under the doctrine of equivalents;

(B) Enter judgment that ZTE has induced infringement and continues to induce infringement of one or more claims of the ’232 Patent;

(C) Enter judgment that ZTE has contributed to and continues to contribute to the infringement of one or more claims of the ’232 Patent;

(D) Award Brazos damages, to be paid by ZTE in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by ZTE of the ’232 Patent through the date such judgment is entered in accordance with 35 U.S.C. §284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. §284;

(E) Declare this case exceptional pursuant to 35 U.S.C. §285; and

(F) Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: June 3, 2020

Respectfully submitted,

/s/ James L. Etheridge

James L. Etheridge
Texas State Bar No. 24059147
Ryan S. Loveless
Texas State Bar No. 24036997
Travis L. Richins
Texas State Bar No. 24061296
ETHERIDGE LAW GROUP, PLLC
2600 E. Southlake Blvd., Suite 120 / 324
Southlake, Texas 76092
Telephone: (817) 470-7249
Facsimile: (817) 887-5950
Jim@EtheridgeLaw.com
Ryan@EtheridgeLaw.com
Travis@EtheridgeLaw.com

COUNSEL FOR PLAINTIFF